

Thirdly, that those which they call the eyes of Crabs, Lobsters, Shrimps, and the like, and are really so, are *Hemisphere's*, almost in the same manner as these of Flies are. And that they really are so, I have very often try'd, by cutting off these little movable knobs, and putting the creature again into the water, that it would swim to and fro, and move up and down as well as before, but would often hit it self against the rocks or stones; and though I put my hand just before its head, it would not at all start or fly back till I touch'd it, whereas whilst those were remaining, it would start back, and avoid my hand or a stick at a good distance before it touch'd it. And if in *crustaceous* Sea-animals, then it seems very probable also, that these knobs are the eyes in *crustaceous* Insects, which are also of the same kind, onely in a higher and more active Element; this the conformity or congruity of many other parts common to either of them, will strongly argue, their *crustaceous* armour, their number of leggs, which are six, beside the two great claws, which answer to the wings in Insects; and in all kind of Spiders, as also in many other Insects that want wings, we shall find the compleat number of them, and not onely the number, but the very shape, figure, joints, and claws of Lobsters and Crabs, as is evident in Scorpions and Spiders, as is visible in the second *Figure* of the 31. *Scheme*, and in the little Mite-worm, which I call a Land-crab, describ'd in the second *Figure* of the 33. *Scheme*, but in their manner of generation being oviparous, &c. And it were very worthy observation, whether there be not some kinds of transformation and metamorphosis in the several states of *crustaceous* water-animals, as there is in several sorts of Insects; for if such could be met with, the progress of the variations would be much more conspicuous in those larger Animals, then they can be in any kind of Insects our colder Climate affords.

These being their eyes, it affords us a very pretty Speculation to contemplate their manner of vision, which, as it is very differing from that of *biocular* Animals, so is it not less admirable.

That each of these Pearls or *Hemispheres* is a perfect eye, I think we need not doubt, if we consider onely the outside or figure of any one of them, for they being each of them cover'd with a transparent protuberant *Cornea*, and containing a liquor within them, resembling the watry or glassie humours of the eye, must necessarily refract all the parallel Rays that fall on them out of the air, into a point not farr distant within them, where (in all probability) the *Retina* of the eye is placed, and that opacous, dark, and mucous inward coat that (I formerly shew'd) I found to subtend the concave part of the cluster is very likely to be that *tunicle* or coat, it appearing through the *Microscope* to be plac'd a little more than a Diameter of those Pearls below or within the *tunica cornea*. And if so, then is there in all probability, a little Picture or Image of the objects without, painted or made at the bottom of the *Retina* against every one of those Pearls, so that there are as many impressions on the *Retina* or opacous skin, as there are Pearls or *Hemispheres* on the cluster. But because it is impossible for any protuberant surface whatsoever, whether *sphærial* or other, so to refract the Rays that come from farr remote

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*lateral* points of any Object as to collect them again, and unite them each in a distinct point, and that onely those Rays which come from some point that lies in the *Axis* of the Figure produc'd, are so accurately refracted to one and the same point again, and that the *lateral* Rays, the further they are remov'd, the more imperfect is their refracted confluence; It follows therefore, that onely the Picture of those parts of the external objects that lie in, or neer, the *Axis* of each *Hemisphere*, are discernably painted or made on the *Retina* of each *Hemisphere*, and that therefore each of them can distinctly sense or see onely those parts which are very neer perpendicularly oppos'd to it, or lie in or neer its optick *Axis*. Now, though there may be by each of these eye-pearls, a representation to the Animal of a whole *Hemisphere* in the same manner as in a man's eye there is a picture or sensation in the *Retina* of all the objects lying almost in an *Hemisphere*; yet, as in a man's eye also, there are but some very few points which lying in, or neer, the optick *Axis* are distinctly discern'd: So there may be multitudes of Pictures made of an Object in the several Pearls, and yet but one, or some very few that are distinct; The representation of any object that is made in any other Pearl, but that which is directly, or very neer directly, oppos'd, being altogether confus'd and unable to produce a distinct vision.

So that we see, that though it has pleas'd the All-wise Creator, to indue this creature with such multitudes of eyes, yet has he not indued it with the faculty of seeing more then another creature; for whereas this cannot move his head, at least can move it very little, without moving his whole body, *biocular* creatures can in an instant (or the twinkling of an eye, which, being very quick, is vulgarly used in the same signification) move their eyes so as to direct the optick *Axis* to any point; nor is it probable, that they are able to see attentively at one time more then one Physical point; for though there be a distinct Image made in every eye, yet 'tis very likely, that the observing faculty is only employ'd about some one object for which they have most concern.

Now, as we accurately distinguish the site or position of an Object by the motion of the Muscles of the eye requisite to put the optick Line in a direct position, and confus'dly by the position of the imperfect Picture of the object at the bottom of the eye; so are these *crustaceous* creatures able to judge confus'dly of the position of objects by the Picture or impression made at the bottom of the opposite Pearl, and distinctly by the removal of the attentive or observing faculty, from one Pearl to another, but what this faculty is, as it requires another place, so a much deeper speculation. Now, because it were impossible, even with this multitude of eye-balls, to see any object distinct (for as I hinted before, onely those parts that lay in, or very neer, the optick Lines could be so) the Infinitely wise Creator has not left the creature without a power of moving the head a little in *Aerial crustaceous* animals, and the very eyes also in *crustaceous* Sea-animals; so that by these means they are enabled to direct some optick line or other against any object, and by that means they have the visive faculty as compleat as any Animal that can move its eyes.

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Distances